

CLAIMS

What is claimed is:

1. A shock absorber comprising:
 - a pressure tube having a working chamber disposed therewithin;
 - a piston slidably disposed within said working chamber and dividing said working chamber into an upper working chamber and a lower working chamber;
 - a reserve tube surrounding said pressure tube to define a reserve chamber;
 - an intermediate tube disposed between said reserve tube and said pressure tube to define an intermediate chamber;
 - a collar attached to said intermediate tube; and
 - an external control valve having a valve seat received within said collar in an installed position.

2. The shock absorber of claim 1 wherein said collar is further defined by a shoulder portion extending generally lateral to said intermediate tube and a radial neck portion extending generally perpendicularly to said intermediate tube, said neck portion defining an inner diameter.

3. The shock absorber of claim 2 wherein said valve seat defines an outer diameter, said outer diameter forming a slip fit with said inner diameter of said neck in said installed position.

4. The shock absorber of claim 3 further comprising a seal disposed between said valve seat and said collar.

5. The shock absorber of claim 2 wherein said collar is welded onto said intermediate tube such that the inner diameter of said neck aligns with a passage on said intermediate tube.

6. The shock absorber of claim 1 wherein said external control valve includes an inlet in fluid communication with said upper working chamber and said lower working chamber through said intermediate chamber.

7. The shock absorber of claim 1 wherein said external control valve includes an outlet in fluid communication with said lower working chamber through said reserve chamber.

8. The shock absorber of claim 7 wherein said external control valve includes an outer housing attached to said reserve tube in an installed position, said reserve tube including a passage for providing fluid communication between said control valve and said reserve chamber.

9. The shock absorber of claim 1, further comprising an o-ring disposed around said valve seat, said o-ring providing a seal between said inner diameter of said neck and said outer diameter of said valve seat.

10. A shock absorber comprising:
 - a reserve tube defining a reserve chamber;
 - an intermediate tube defining an intermediate chamber and disposed within said reserve tube;
 - a pressure tube arranged within said intermediate tube and having a working chamber therein;
 - a collar attached to said intermediate tube; and
 - an external control valve attached to said reserve tube and received within said collar in an installed position.

11. The shock absorber of claim 10 wherein said collar is further defined by a shoulder portion extending generally lateral to said intermediate tube and a radial neck portion extending generally perpendicularly to said intermediate tube, said neck portion defining an inner diameter.

12. The shock absorber of claim 11 wherein said external control valve includes a valve seat defining an outer diameter, said outer diameter forming a slip fit with said inner diameter of said neck in said installed position.

13. The shock absorber of claim 12 further comprising a seal disposed between said valve seat and said collar.

14. The shock absorber of claim 11 wherein said collar is welded onto said intermediate tube such that the inner diameter of said neck aligns with a passage on said intermediate tube.

15. The shock absorber of claim 10 wherein said external control valve includes an outer housing attached to said reserve tube in an installed position, said reserve tube including a passage for providing fluid communication between said control valve and said reserve chamber.

16. A method of making a shock absorber comprising:

providing a reserve tube defining a reserve chamber, an intermediate tube defining an intermediate chamber and having a passage incorporated on an outer wall thereof, said intermediate tube disposed within said reserve tube and a pressure tube arranged within said intermediate tube and having a working chamber therein;

attaching a collar to said intermediate tube, said collar extending generally perpendicularly to said intermediate tube;

slidably inserting a valve seat of an external control valve into said collar; and

attaching said external control valve to said reserve tube.

17. The method of claim 16 wherein attaching a collar includes aligning an inner diameter of said collar with said passage incorporated on said intermediate chamber creating a fluid pathway therebetween.

18. The method of claim 17 wherein attaching a collar includes welding said collar to said intermediate tube.

19. The method of claim 16 wherein slidably inserting a valve seat further includes aligning an output of said external control valve with a passage incorporated on said reserve chamber for providing fluid communication between said external control valve and said reserve chamber.

20. The method of claim 16 wherein attaching said external control valve includes welding an outer housing of said external control valve to said reserve tube.